

REMARKS/ARGUMENTS

This Amendment is being filed in response to the Final Office Action dated August 6, 2008. Reconsideration and allowance of the application in view of the remarks to follow are respectfully requested.

Claims 1-20 are currently pending in the Application. Claims 1 and 11 are independent claims.

In the Final Office Action, the Amendment submitted on May 5, 2008 is objected to because it is alleged that the Amendment introduced new matter into the disclosure. The alleged new matter was provided in claim 12 which recites in pertinent part "wherein the aqueous surfactant solution is selected to bond to broken substrate bonds in the micro-crack." This objection to the disclosure is respectfully traversed. It is respectfully submitted that the disclosure as filed provides ample support for this claim recitation. For example, the abstract makes clear that (emphasis added) "The invention relates to a method of breaking a substrate of a brittle material, the method comprising the steps of ... moving the laser beam and the substrate with respect to each other to create a line of heated spots on the substrate (2), cooling the heated spots on the substrate by locally applying a cooling medium

(4) behind the heated spots such that a micro-crack is propagated in the line of heated spots, ... wherein, the cooling medium comprises an aqueous surfactant solution. The surfactants will connect to the broken siloxane bonds inside the surface cracks."

The present application on page 2, lines 1-11 makes clear that (emphasis added) "the method according to the invention is characterized in that the cooling medium comprises an aqueous surfactant solution. The inventors have realized that the increase of the breaking load in the conventional process is due to locking or even healing of the micro-cracks. However, if the cooling medium comprises an aqueous surfactant solution the surfactants will connect to the broken siloxane bonds inside the micro-cracks. Recombination and healing of the broken siloxane bonds will not occur and the required breaking load will remain constant over time. Furthermore, the surfactants will change (i.e. lower) the surface energy of the cracks. Consequently, the cracks will be kept open and the load needed to open the cracks will be lowered."

Further the present application recites that (emphasis added) "FIG. 1 is a schematic view from above of an apparatus employing the method according the invention. A spot 3 of a laser beam is focussed on substrate 1 of a brittle material, e.g. glass,

crystalline silica, ceramics or compositions thereof. The energy contained in the laser spot 3 causes local heating of the substrate. A cooling medium from a nozzle 4 in the vicinity of the laser spot 3 (in most cases positioned behind the laser spot) cools the heated spot. This rapid temperature differential causes a thermal shock and causes a pre-existing micro-crack to propagate."

(E.g., see, present patent application, page 2, lines 24-30.)

"CTAB is a compound belonging to the class of cationic surfactants, i.e. a surface active agent, a substance such as a detergent that reduces the surface tension of a liquid. Good results were also obtained with compounds belonging to the classes of non-ionic and anionic surfactants, such as octadecyl deca(ethylenoxide) hydroxide or dodecylbenzene sulfonic acid sodium salt, respectively. All compounds have in common their capability of binding to the broken siloxane bonds (`dangling bonds`) inside the micro-cracks." (E.g., see, present patent application, page 3, lines 23-28.)

As should be clear from the above discussion regarding the original disclosure of the present patent application, there is more than ample support for the claim 12 recitation of "wherein the aqueous surfactant solution is selected to bond to broken substrate

bonds in the micro-crack." Accordingly, it is respectfully requested that the objection to the Amendment submitted on May 5, 2008 be withdrawn.

Claims 1-4, 6, 8, 10-15, 17 and 19 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over U.S. Patent No. 6,211,488 to Hoekstra ("Hoekstra") in view of U.S. Patent No. 6,673,752 to Bookbinder ("Bookbinder"). Claims 5, 7, 9, 16, 18 and 20 are rejected under 35 U.S.C. § 103 as allegedly unpatentable over Hoekstra and Bookbinder in view of U.S. Patent No. 5,565,363 to Iwata ("Iwata"). These rejections are respectfully traversed. It is respectfully submitted that claims 1-20 are allowable over Hoekstra in view of Bookbinder alone, and in view of Iwata for at least the following reasons.

In a Response to Arguments section of the Final Office Action (see, Final Office Action, page 8), it is alleged that "because the void is at the edge and hence it is on a surface of the substrate." This assertion of the Final Office Action is respectfully refuted and is not supportable by the clear and incontrovertible language of Hoekstra.

Hoekstra makes clear that the (emphasis added) "crack inside the substrate that does not extend to either the upper or lower

surface." (See, Hoekstra, abstract.) As shown in FIG. 4, "[t]he pulsed laser 34 through the lens 35 creates a void 37 in the substrate from the edge of the substrate 4 inward at a certain distance below the upper face of the substrate 4." (See, Hoekstra, Col. 5, lines 62-64.)

As is clear from FIG. 4 of Hoekstra and the accompanying description discussed above, the void 37 is below the surface of the substrate 4 and does not extend to the surface of the substrate 4.

Hoekstra makes clear that a quenching stream 44 is only introduced after the pulsed laser is applied and before break beams 44 and 46 break the substrate along separation line 45 (see, Hoekstra, FIGs. 3 and 5 and accompanying description contained in Col. 6, lines 35-49.)

Hoekstra further makes clear that it is only when the substrate is introduced to the break beams 44, 46 wherein (emphasis added) "the break beams 46 and 48 heat the regions on both sides of the microcrack to create tensile forces to that are sufficient to separate the substrate 4 along the separation line 45 from the microcrack to the bottom surface." (see, Hoekstra, Col. 6, lines 45-49.) It is respectfully submitted that Hoekstra unequivocal

language makes clear that the microcrack, prior to introduction to the break beams 44, 46, does not extend to the surface of the substrate. Hoekstra teaches that benefit of this microcrack formation is that "the laser scribe initiation device 24 eliminates inherent drawbacks of a mechanical scribe initiation system. For example, the use of the laser scribe initiation device 24 eliminates any particulate material that may be generated by mechanically forming the microcrack."

It is therefore respectfully submitted that even if the quenching stream of Hoekstra were to be replaced by the organic solution of Bookbinder in the device of Hoekstra, one is still provided with a system wherein the cracks in the substrate are formed in the substrate and not on the substrate as substantially recited in each of claims 1 and 11. Accordingly, even in substituting the organic solution of Bookbinder for the cooling stream of Hoekstra, one is not provided with the present system.

The method of claim 1 is not anticipated or made obvious by the teachings of Hoekstra in view of Bookbinder. For example, Hoekstra in view of Bookbinder does not disclose or suggest, a method that amongst other patentable elements, comprises (illustrative emphasis provided) "heating the substrate with a

laser beam to create a heated spot on the substrate, ... cooling
the heated spots on the substrate by locally applying a cooling
medium such that a micro-crack in the line of heated spots is
propagated on the substrate" as recited in claim 1, and as
similarly recited in claim 11. Clearly in Hoekstra, the heated
spot and micro-crack is purposefully propagated in the substrate
without extending to the outer or lower surface of the substrate.
Iwata is cited in rejecting dependent claims and as such, does
nothing to cure the deficiencies in each of Hoekstra and
Bookbinder.

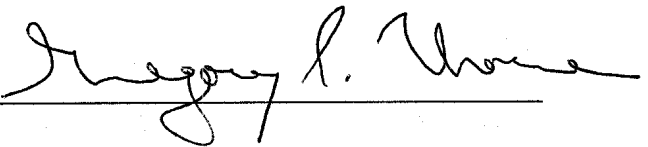
Based on the foregoing, the Applicants respectfully submit
that independent claims 1 and 11 are patentable over Hoekstra in
view of Bookbinder and notice to this effect is earnestly
solicited. Claims 2-10, 12-20 respectively depend from one of
claims 1 and 11 and accordingly are allowable for at least this
reason as well as for the separately patentable elements contained
in each of the claims. Accordingly, separate consideration of each
of the dependent claims is respectfully requested.

In addition, Applicants deny any statement, position or
averment of the Examiner that is not specifically addressed by the
foregoing argument and response. Any rejections and/or points of

argument not addressed would appear to be moot in view of the presented remarks. However, the Applicants reserve the right to submit further arguments in support of the above stated position, should that become necessary. No arguments are waived and none of the Examiner's statements are conceded.

Applicants have made a diligent and sincere effort to place this application in condition for immediate allowance and notice to this effect is earnestly solicited.

Respectfully submitted,

By 

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